REMARKS

I. Status of the Application

Claims 1-55 are pending in this application. Claims 4-15, 18, 25-26, 31, 45-47 have been withdrawn as directed to non-elected species.

Applicant gratefully acknowledges the withdrawal of the 35 USC 103(a) rejection based on Richards et al. "Optimisation of a Neural Network Model for Calibration of Voltammetric Data," *Chemometrics and Intelligent Laboratory Systems*, 61, 2002, p. 35-49 (hereinafter "Richards") in view of US 6,331,244 to Lewis et al. (hereinafter "Lewis"), in view of Applicant's remarks regarding the lack of the teachings asserted by the Examiner within the disclosure of Lewis. Because of the withdrawal of the previous grounds for rejection, prosecution is being reopened for consideration of new grounds for rejection.

Claim Rejections - 35 USC § 103(a)

Claims 1-3, 16, 17, 19-24, and 53 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Richards in view of US 6,365,033 to Graham et al. (hereinafter "Graham"). For at least the reasons set forth below, this rejection is respectfully traversed.

Claims 27-44, 48, 49, 54, and 55 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Richards in view of Graham as applied above to claim 1, and further in view of Applicant's admission of prior art. For at least the reasons set forth below, this rejection is respectfully traversed.

Claims 50-52 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Richards in view of Graham and Applicant's admission of prior art as applied to claim 27, and further in

view of Schneider "Cross Validation," February 1997, http://www.cs.cmu.edu/~schneide/tut5/node42.html. For at least the reasons set forth below, this rejection is respectfully traversed.

Applicant respectfully requests reconsideration of the application in view of the following remarks, which are intended to place this case in condition for allowance.

II. Claims 1-3, 16, 17, 19-24 and 53 are Not Obvious over Richards in view of Graham

At page 2, section 4 of the instant Office Action, claims 1-3, 16, 17, 19-24 and 53 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Richards in view of Graham. Applicant respectfully traverses the rejection as failing to set forth a *prima facie* case of obviousness.

The Examiner admits that Richards fails to teach calibration of voltammetric data from electroplating baths. The Examiner relies upon Graham to disclose the generation of calibration curves used to determine the composition of copper electroplating baths from voltammetric responses. "If sufficient care is taken in methods development and measurement technique – if, for instance, all component concentrations other than the one of interest can be held relatively constant – then stripping voltammetry can be employed to generate calibration curves with which subsequent analyses can be compared to yield reasonably accurate quantification of analyte composition." (col. 6, lines 28-34) However, Graham provides no details as to how the calibration curves may be obtained, beyond the teaching to hold all component concentrations constant except for the one component of interest. Graham provides no signal or data processing details for obtaining a calibration curve for a single component, much less calibration for the multiple components present in its electroplating baths. As evidenced by Richards, generation of the calibration data set involves complex signal and data processing. At most, Graham states without reference to other sources, "A number of calibration methods have been proposed for developing correlations between stripping charges and concentration of plating bath species;

several have reportedly been put into practice with good results." (col. 7, lines 8-12) But Graham still does not provide motivation to combine with Richards. At most, Graham would motivate the skilled artisan to look for methods to calibrate voltammetric responses for electroplating baths, especially using stripping voltammetry. But the skilled artisan would not be motivated to look to the calibration method of Richards, which uses a different voltammetric method, dual pulse staircase voltammetry, on aliphatic analyte solutions containing no metals. Richards' method is not similar to stripping voltammetry, because Richards's solutions contain no metals that can be plated onto the electrode and subsequently stripped off.

The Examiner is of the opinion that it would be obvious to one of ordinary skill in the art to use the method of Richards to calibrate voltammetric data from other solutions, and expectation of success for applying the calibration method of Richards to complex electroplating baths comes from the teachings of Graham. However, Richards in no way suggests the desirability of using the described neural network model to calibrate voltammetric data acquired from anything other than mixtures of aliphatic compounds. Richards utilizes as model systems mixtures of components that possess similar electrochemical properties, are present at similar concentrations, and do not interact with each other. Since the composition of Graham's electroplating bath is substantially more complex (col. 2, lines 5-49) than Richards' 3-component aliphatic solution, the skilled artisan would not expect to successfully apply Richards' calibration method to Graham's electroplating bath, which comprises mixtures of components that possess different electrochemical properties, are present at significantly different concentrations, and interact electrochemically with each other. At most, it would be obvious-to-try, which is not the standard for obviousness. "An 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or the that the claimed result would be obtained if certain directions were pursued." *In re Eli Lilly & Co.*, 902 F.2d 943, 945, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990).

The Examiner continues to rely upon Richards to render obvious the subject matter of dependent claims 22 and 23, asserting that Richards teaches in Figure 3 the use of a combination of multiple portions of a complete electroanalytical response using multiple independent responses at various concentrations. However, the data shown in Figure 3 of Richards is obtained by using only one electroanalytical technique, namely dual pulse staircase voltammetry (page 36, 2. Experimental). Richards simply teaches a method of building calibration curves by obtaining multiple electroanalytical responses at various sample concentrations using the same electroanalytical technique (dual pulse staircase voltammetry). Figure 3 shows an analysis of different types of calibration error, still obtained using only one electroanalytical technique. Richards neither teaches, suggests, nor provides motivation to use more than one electroanalytical technique to obtain independent electroanalytical responses, and then to combine one or more portions of the independent electroanalytical responses (obtained using independent and different electroanalytical techniques).

Since Richards uses only one type of electroanalytical response obtained from one electroanalytical technique per sample set, Richards is prone to bias and other disadvantages of the chosen electroanalytical technique. In contrast, the embodiments of the present invention recited in claims 22 and 23 introduce a novel and nonobvious method of information enhancement by simultaneous decomposition of data from various independent electroanalytical responses obtained by using different electroanalytical techniques. This method is called "gluing" of voltammograms and is disclosed at page 44, last paragraph to page 45, first paragraph of the specification and in Table 7. One can obtain information significantly free of bias if one simultaneously uses information obtained from more than one electroanalytical technique on the same sample, for example by combining an optimal region of an AC-voltammogram and an optimal region of a DC-voltammogram. This is not taught or suggested by either Richards or Graham.

As the combination of Richards and Graham cannot support a *prima facie* case of

obviousness, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 1-3, 16, 17, 19-24 and 53.

III. Claims 27-44, 48, 49, 54, and 55 are Not Obvious over Richards in view of Graham and further in view of Applicant's admission of prior art

At page 4, section 5 of the instant Office Action, claims 27-44, 48, 49, 54, and 55 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Richards in view of Graham and further in view of Applicant's admission of prior art. Applicant respectfully traverses the rejection as failing to set forth a *prima facie* case of obviousness.

For at least the reasons submitted by Applicants in previous Office Action responses and incorporated herein by reference (section VII of the response filed June 6, 2006, and section III of the response filed November 3, 2006), a *prima facie* case of obviousness over Richards and the admitted references cannot be made against the subject claims. For the same reasons that Graham fails to the remedy the deficiencies of Richards in section II above, Graham also fails to remedy the deficiencies of Richards and the admitted references in the subject rejection. As discussed in section II above, Richards and Graham fail to provide motivation to combine teachings. The admitted references also fail to provide motivation to combine teachings with Richards and Graham to arrive at the claimed method with a reasonable expectation of success. Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 27-44, 48, 49, 54 and 55.

IV. Claims 50-52 are Not Obvious over Richards in view of Graham and Applicant's admission of prior art and further in view of Schneider

At page 6, section 6 of the instant Office Action, claims 50-52 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Richards in view of Graham and Applicant's

admission of prior art and further in view of Schneider. Applicant respectfully traverses the rejection as failing to set forth a *prima facie* case of obviousness.

For at least the reasons submitted by Applicants in previous Office Action responses and incorporated herein by reference (section VIII of the response filed June 6, 2006, and section IV of the response filed November 3, 2006), a *prima facie* case of obviousness over Richards, the admitted references, and Schneider cannot be made against the subject claims. For the same reasons that Graham fails to the remedy the deficiencies of Richards in section II above, Graham also fails to remedy the deficiencies of Richards, the admitted references, and Schneider in the subject rejection. As discussed in section III above, Richards, Graham, and the admitted references, fail to provide motivation to combine teachings, nor do they teach or suggest cross validation. Schneider teaches cross validation in general, but fails to provide motivation to combine teachings with Richards, Graham, and the admitted references to arrive at the claimed method with a reasonable expectation of success. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 50-52.

V. Summary:

Two aspects of the present invention are neither taught nor suggested by the prior art relied upon in the Office Action. The first is the complexity of the plating mixture, and the second one is the "gluing" approach employed in the analyses.

The present invention deals with solutions that are mixtures of very different constituents having distinctively different chemical/electrochemical characteristic. And they are at very different levels of concentrations (from molar to micro- or even nanomolar; or from hundreds of gram per liter to micrograms per liter).

Contrast this with the teachings of the cited prior art; when Graham is analyzing one

component, he is trying to keep all other components at constant levels (one component at the time). Others are trying to use separation techniques to extract a single component and analyze it under optimum conditions.

In the present invention, unlike in the cited prior art, no pretreatment steps are employed (no additions, no separation), and though constituents are so different, they are all measured in the same solution, with no additional preparation steps required.

Applicant also submits that the Examiner perhaps fails to appreciate one critical aspect of the present method, which entails what the inventors refer to as a "gluing," namely a method of information enhancement provided by the simultaneous decomposition of data from various independent electroanalytical responses obtained by using different electroanalytical techniques.

VI. Conclusion:

In view of the foregoing remarks, pending claims 1-3, 16, 17, 19-24, 27-30, 32-44, and 48-55 should now be in condition for allowance, and an indication to that effect from the Examiner is respectfully requested.

FEE AUTHORIZATION

Please charge any fees due in connection with this filing to our Deposit Account No. 19-0733.

Respectfully submitted,

/Ernest V. Linek/

Ernest V. Linek – Reg. No. 29,822
Attorney for Applicant

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